

## Exercise 10.2A Fluency and skills

- 1 Given that  $X \sim B(5, 0.3)$ , find
  - a  $P(X = 3)$
  - b  $P(X \leq 2)$
  - c  $P(X \neq 0)$
- 2  $X \sim B(8, 0.6)$ . Find, to 2 sf
  - a  $P(x \leq 0)$
  - b  $P(x \leq 3)$
  - c  $P(x < 5)$
  - d  $P(x > 2)$
- 3 The random variable  $T$  has a binomial distribution,  $n = 8$ ,  $p = \frac{1}{4}$ . Find, to 2 sf
  - a  $P(T = 4)$
  - b  $P(T \geq 7)$
  - c  $P(3 \leq T < 5)$
- 4 Given that  $X \sim B(5, 0.4)$ 
  - a Write an expression for  $P(X = x)$
  - b Copy and complete the probability distribution table.

$x$	0	1	2	3	4	5
$P(X = x)$	0.078			0.230	0.077	0.010

- 5 A fair six-sided dice is thrown 4 times and the random variable  $X$  denotes the number of 6s obtained.
  - a Give the distribution of  $X$
  - b Find, giving your answers to 3 dp
    - i  $P(X = 4)$
    - ii  $P(X > 2)$
    - iii  $P(1 \leq X < 3)$
- 6 A bag contains 12 counters. Three are red and the rest are black. A sample of five counters is taken, placing each back in the bag after it is chosen. Find the probability that the sample contains more than 3 red counters.

**Exercise 10.2A Fluency and skills**

**1a**  $P(X=3)=0.132$

**1b**  $P(X\leq 2)=0.837$

**1c**  $P(X\neq 0)=1-P(X=0)=0.832$

**2a** 0.00066

**2b** 0.17

**2c**  $P(x < 5) = P(x \leq 4)$   
 $= 0.41$

**2d**  $P(x > 2) = 1 - P(x \leq 2)$   
 $= 0.95$

**3a**  $P(T=4)=0.087$

**3b**  $P(T\geq 7)=P(T=7)+P(T=8)$   
 $=0.00038$

**3c**  $P(3\leq T < 5)=P(T=3)+P(T=4)$   
 $=0.29$

**4a**  $P(X=x) = {}^5C_x \times 0.4^x \times 0.6^{(5-x)}$

**4b**

$x$	0	1	2	3	4	5
$P(X=x)$	0.078	<b>0.259</b>	<b>0.346</b>	0.230	0.077	0.010

**5a**  $X \sim B\left(4, \frac{1}{6}\right)$

**5b i**  $P(X=4)=0.001$

**ii**  $P(X>2)=1-P(X\leq 2)$   
 $=0.016$

**iii**  $P(1\leq X < 3)=P(X=1)+P(X=2)$   
 $=0.502$

**6** Let  $X$  be the number of red counters in the sample.

$X \sim B\left(5, \frac{1}{4}\right)$

$P(X>3)=0.01465+0.00098$   
 $=0.016 \text{ (3 dp)}$